

ARNOLD ARBORETUM

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Dwarf Conifers. Of many of the cone-bearing trees there are abnormal dwarf forms, and a few conifers are naturally dwarf shrubs. The former are of different origin; most of them are seedlings, some have grown from buds on branches of large trees, and others have been produced by exposure to excessive cold and high winds, and these when transferred to more favorable surroundings often lose their dwarf habit. A good example of a dwarf of the last class is the depauperate Larch which grows at the timber line on Mt. Fugi in Japan. Seedlings of this little plant raised in the Arboretum twenty-five years ago are now nearly of the same size as the seedlings of the trees of the Japanese valleys raised at the same time. In the sandy swamps of Prince Edward Island Black Spruces not more than two feet high produce cones and fertile seeds, and near the timber line of the White Mountains it is possible to walk on dwarf mats of the Balsam Fir which lower down on these mountains is a tall tree. Transferred to better soil where the winter climate is less severe these alpine and boreal dwarfs would soon assume the tree habit of the species. Dwarfs of some species, however, which evidently owe their habit to environment, retain the dwarf habit when transferred to more favorable surroundings. Such dwarfs are some of the forms of the European *Pinus montana* from high altitudes and some dwarf forms of Junipers which reproduce the dwarf form in their seedlings. Seedling dwarfs have been produced by many different species, but they are naturally most numerous in species which have been largely raised in nurseries where seedlings are carefully watched and abnormal forms are preserved. It is not surprising therefore, that trees like the eastern Arbor Vitae and the Norway

Spruce have produced many such forms in nurseries as few other cone-bearing trees have been so largely raised from seed.

It is only in recent years that dwarf conifers have attracted much attention, for Loudon in his "Arboretum et Fruticetum Botanicum" published in 1838 enumerates only ten. These are two dwarf forms of *Pinus montana*, two forms of the Norway Spruce, a dwarf Cedar of Lebanon, a dwarf Red Cedar (*Juniperus virginiana*), a prostrate form of *Juniperus sabina*, and two dwarf forms of *Juniperus communis*. He knew no dwarf Arbor Vitae, *Chamaecyparis*, Hemlock, or dwarf form of *Abies*. Beissner in the second edition of his "Handbuch der Nadelholzkunde," published in 1899, enumerates one hundred and four dwarf conifers in thirty-one species; of these twenty-five are forms of the Norway Spruce, eight are forms of Lawson's Cypress (*Chamaecyparis Lawsoniana*), and eight are forms of the Arbor Vitae of the eastern United States. In addition to the plants enumerated by Beissner there are a few which originated in this country and which do not appear to have been known to him.

There is a good but by no means a complete collection of dwarf conifers in the Arboretum, for it is difficult to keep track of the new forms which appear in the nurseries where large numbers of conifers are raised from seed and are often given names without descriptions, and some dwarfs like those of Lawson's Cypress and the Chinese Arbor Vitae are not hardy here. The Arboretum collection is much visited, however, by nurserymen for there is now a demand for these plants, which have their uses in small gardens and are less happily planted in making low banks of foliage about the base of suburban cottages.

Perhaps the handsomest of the dwarf conifers in the Arboretum collection is a form of the Japanese *Pinus densiflora* (var. *umbraculifera*). This is a wide, vase-shaped plant which in Japanese gardens is often ten feet high and broader than high. The leaves are of a bright cheerful green and comparatively small plants flower and produce minute cones. Among the fourteen or fifteen dwarf forms of the Norway Spruce none is handsomer than one of the varieties described by Loudon in 1839 (var. *Clanbrasiliana*). This is a low, very compact, round-topped bush which rarely grows more than three feet high but spreads to a diameter much greater than its height. The plant is said to have originated on the Moira estate near Belfast, Ireland, toward the end of the eighteenth century and to have been carried to England by Lord Clanbrasil for whom it was named. Equally good is the variety *nana* which has a flatter top and does not grow as tall as the *Clanbrasiliana* but spreads into a broad bush. The subglobose var. *Gregoriana* and the variety *prostrata* are interesting plants. Some of the dwarf Norway Spruces, especially the variety *Ellwangeriana*, have a tendency at the end of a few years to form a vigorous leading shoot and eventually to become arborescent.

Two dwarfs originated in the Arboretum in 1874 among seedlings of *Picea pungens*, the Colorado Blue Spruce and *Abies lasiocarpa*. The original plant of the former is now seven feet high and ten or twelve

feet in diameter, and has so far escaped the loss of branches which disfigures this Spruce after it is thirty years old. Although well worth the attention of lovers of dwarf conifers, *Pinus pungens compacta* is little known beyond the limits of the Arboretum. The seedling of *Abies lasiocarpa* retained its dwarf habit for many years but has now begun to grow more vigorously and to assume the typical habit of the species. The dwarf of the European Silver Fir (*Abies Picea compacta*) behaves here in the same way and after a few years grows out of its dwarf habit. There is in the collection a small plant of a dwarf of *Abies concolor* which is very compact, but it is too soon to speak of its value. The well known dwarf of the Balsam Fir (*Abies balsamea* var. *hudsonica*) is a real dwarf only a few inches high. A number of seedling forms of the White Pine (*Pinus Strobus*) and of the Scotch Pine (*Pinus sylvestris*) are in the collection, but the best known and most generally planted dwarf Pines are the mountain forms of the European *Pinus montana* which appear in the catalogues of nurserymen as *Pinus pumilio* and *P. Mughus*. There are many forms of this hardy dwarf; they are broad shrubs with erect or semiprostrate stems and are rarely more than ten feet high, but often much broader than tall. Seedlings of these plants show great variation in size and habit, and new forms are constantly found in nursery seed-beds. The dwarf form of the Douglas Spruce (*Pseudotsuga Douglasii* var. *globosa*) has proved one of the slowest growing of these plants in the Arboretum collection.

In the common Hemlock of eastern North America the tendency to variation in seedling plants is unusually strong and dwarfs differing in size, shape and vigor are often found in the neighborhood of Hemlock groves. Some of these have been propagated and have received names but as different names have been used for the same or nearly the same forms it is not now possible, even if it were desirable, to distinguish all these dwarf Hemlocks by name.

Among the seedlings of the Arbor Vitae of eastern North America are found some of the handsomest of the dwarf conifers. There is a large collection of abnormal forms of this tree in the Arboretum collection and among them none are better than those called "Little Gem," *compacta* and *Hoveyi*. Seedlings of the Japanese Retinosporas (*Chamaecyparis obtusa* and *pisifera*) show, too, a great tendency to variation. One of the handsomest of these forms is *C. obtusa nana*, a compact, pyramidal, slow-growing plant. The largest specimen in the collection is now about eight feet tall. Other forms of *C. obtusa* are compact mats which show little indication of growing more than a few inches high. In the collection there are among others dwarf forms of *C. pisifera*, plants with yellow-tipped branches and others with yellow and with white leaves and plants of the variety *filifera* with green and with yellow leaves.

Among the Junipers are found some of the most useful dwarf conifers. Some of these are forms of arborescent species and others are natural dwarfs which reproduce themselves from seed. Among the former are three varieties of the so-called Red Cedar of the eastern

states (*Juniperus virginiana*). One of these (var. *globosa*) is a compact, round-topped bush taller than broad, and in the Arboretum collection where it has been growing for fifteen years it is about three feet high. The history of this plant is not known at the Arboretum. It came here from Holland and probably originated in a European nursery. The variety *Kosteriana* forms a wide open bush with erect and spreading, gracefully arching stems from two to three feet tall. This is an unusually handsome plant which will prove useful for the margins of beds of taller growing conifers. This variety probably also originated in a European nursery. More interesting even than these nursery forms of the Red Cedar is a plant which grows on a few wind-swept cliffs on the coast of Maine. Plants of this form are not more than eighteen inches high, with prostrate stems which spread into dense mats sometimes fifteen feet across. These plants bear fertile seeds, and there are seedlings, grafted plants and young collected plants growing in the Arboretum, but it is too soon to judge if they will retain the habit of the wild plants when planted in less exposed situations. If this form of the Red Cedar retains its dwarf habit in cultivation it will be one of the handsomest of the prostrate Junipers. Of *Juniperus chinensis* there are a number of interesting shrubs in the Arboretum collection. The handsomest of these, var. *Pfitzeriana*, which grows in the form of a low broad pyramid, is the most satisfactory of all Junipers in this climate. Fortunately it can now be found in most American nurseries. There are dwarf round-topped forms of *J. chinensis* with green and with yellow leaves which are less than a foot high; and a form of this Juniper, var. *Sargentii*, from northern Japan with prostrate stems makes mats now eight or ten feet across here. This is a form reproducing itself from seed and has proved to be one of the best of the mat-like Junipers in the collection. With the exception of the dwarf form of the European *J. sabina* (var. *minor*), the lowest Juniper in the collection is *J. horizontalis* which has long prostrate stems with blue-green or in some forms steel blue leaves. This is a North American plant which is widely distributed from the coast of Massachusetts to British Columbia. There are fine masses of this plant in the collection. Less well known is *J. conferta*, another species which covers with long prostrate stems the sand dunes on the coast of Japan. Raised first in the Arboretum three years ago from seeds collected by Wilson in northern Japan there is every reason to believe that this will prove a useful plant in this country. Another prostrate Japanese Juniper, *J. procumbens*, is better known. It is distinguished by its sharply pointed leaves marked on the upper surface by two white lines. This Juniper has not produced seeds and is not known except as a cultivated plant; it is planted, however, in nearly every Japanese garden and has been much planted in California and occasionally in the eastern states. A dwarf Juniper, *J. communis* var. *depressa*, covers thousands of acres of hillsides in the northeastern states where many forms occur differing in the height and in the width of the leaves. These are coarser and less desirable garden plants than *J. horizontalis* and the different low-growing varieties of *J. chinensis* and *J. virginiana*.

These Bulletins will now be discontinued until next spring.